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PUBLIC UTILITIES
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BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF HAWAII

In the Matter of)

PUBLIC UTILITIES COMMISSION)

Instituting a Proceeding to Investigate)
the Implementation Of Feed-in Tariffs)
_____)

Docket No. 2008-0273

HAIKU DESIGN AND ANALYSIS

REPLY BRIEF

AND

CERTIFICATE OF SERVICE

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HAIKU DESIGN AND ANALYSIS

REPLY BRIEF

Carl Freedman, dba Haiku Design and Analysis (HDA) respectfully offers its Reply Brief regarding the implementation of feed in tariffs for Hawaiian Electric Company, Inc., Maui Electric Company Ltd. and the Hawaii Electric Light Company, Ltd. (collectively: HECO Companies).

HDA notes that its Opening Brief was prepared under limiting time constraints due to HDA's other (contractual) commitments. HDA was not able to address all of the issues or to treat the issues in as much depth as would be preferred. This Reply Brief is being drafted in outright haste due to inevitable compelling commitments during the past weeks. HDA apologizes to the Commission and the parties that it has not been able to devote more time and care to the important issues in this proceeding. HDA stands on its Opening Brief to represent its position and recommendations to the Commission in this docket. Several brief comments and clarifications are offered below.

GENERAL COMMENTS AND CLARIFICATIONS:

(1) HDA has already received substantial off-the-record written and verbal “replies” to its opening brief. Several parties have expressed disappointment and dismay asserting that HDA’s Opening Brief is negative, dwells excessively on avoided cost and rate impact issues, does not assertively argue for feed-in tariffs more aggressive than those proposed by the HECO Companies and, for all of these reasons, effectively argues against establishing meaningful feed-in tariffs. HDA would like to clarify its position.

In its opening brief HDA focused on several fundamental regulatory issues that are necessary to consider in order to implement project-cost-based feed-in tariffs. These issues include, for example, (1) how to establish that feed-in tariffs can be “just and reasonable” that are not designed or demonstrated to be “at or below avoided costs” (which is a traditional regulatory standard) and (2) how to address and mitigate potential rate impacts of feed-in tariffs. HDA recommended that, at a minimum, the Commission should adopt feed-in tariffs for some distribution level technologies (such as the FiT’s proposed by the HECO Companies) and a generic feed-in tariff to replace the existing Schedule Q tariff. HDA was silent on several issues. HDA did not address the extent to which the project size limits and tariff penetration caps should be expanded beyond what is proposed by the HECO Companies and Consumer Advocate. HDA did not recommend findings regarding which specific technologies should be approved for further detailed development of feed-in tariffs in the next phase of this proceeding. HDA focused its limited time and resources on

addressing some of the foundational regulatory issues and ignored several issues that are the specific focus of other parties in the proceeding.

HDA would like to make it clear that its focus on regulatory foundations and HDA's recommendations for what the Commission should adopt "at a minimum" should not be interpreted as an argument against adopting feed-in tariffs that go beyond what is being proposed by the HECO Companies and the Consumer Advocate. HDA simply focused on several important but difficult issues that are squarely before the Commission in this docket that need to be resolved in order to adopt any project-cost-based feed-in tariffs.

By supporting what the HECO Companies propose "at a minimum" HDA does not argue against going further. Indeed, as noted below, HDA supports some of the approaches recommended in the opening briefs that go beyond what the HECO Companies recommend.

(2) HDA commends the Solar Alliance and Hawaii Solar Energy Association (SA/HSEA) for crafting several innovative and constructive mechanisms that respond to challenges identified in these proceedings. In particular, in SA/ HSEA's Opening Brief at pages 18 – 19, a matrix is outlined that shows an approach to identifying, for different sizes of projects, how specific components of costs would be allocated to the utility or the developer. In addition to being specific and clear about cost allocation, this approach has several advantages. In conjunction with specifications of which projects would require interconnection studies, it would allow an expanded continuum between smaller projects that are more strictly "plug and play" and larger projects which require more examination of interconnection feasibility. This approach could expand the feasible project size limits for

feed-in tariffs without exacerbating utility system integration concerns. Specifying that some of the costs for the larger projects that vary substantially from project to project would be borne by the project developer makes it more feasible to identify more "discrete" project-cost-based feed-in tariff prices by removing a substantial source of project cost variance.

(3) SA/HSEA also proposes a "pricing and market penetration framework" mechanism to offer blocks of limited subscription with declining prices as a means to limit cost impacts and promote more cost-effective project implementation. (SA/HSEA OB at 20-23). This is consistent with an approach recommended by HDA in its opening brief. HDA notes that this approach would also provide market-based information to the Commission regarding the most economical price for encouraging resource subscription.

In presenting its pricing and market penetration framework SA/HSEA argues against an approach suggested by HDA at the panel hearing and in HDA's opening brief. HDA suggested that one way promote the implementation of the most cost-effective resources would be to start with lower feed-in tariff prices to capture the most cost-effective projects and then increase prices progressively to acquire the necessary subscription. SA/HSEA points out that this approach is contrary to rapid resource acquisition and may "delay everything". HDA acknowledges that this is a fundamental tradeoff that should be weighed carefully by the Commission.

With all feed-in tariff pricing there is a challenging relationship and balance between rate impacts and project subscription. Higher prices result in more rate impact and more project subscription. The pricing and market penetration framework approach generally

outlined by SA/HSEA and HDA is one way to address the uncertainties in establishing a proper balance between the objectives of cost-effectiveness and promoting project subscription.

(4) Michael Champley, consultant to HDA in this docket, prepared a working paper to lay out issues regarding potential feed-in tariff caps to address concerns regarding utility system integration and cost impact concerns. The working paper includes an illustrative quantitative calculation of the rate impacts of a hypothetical set of initial feed-in tariffs. Although this working paper was originally drafted for internal discussion purposes, HDA offers it as an attachment to this reply brief to respond to the feed-in tariff cap proposals offered by other parties in the opening briefs and because it offers some potential value to the Commission in addressing caps and rate impacts.

Recognizing that the evidentiary record in this docket is already closed, the attached paper is offered for its value as an approach to examining the issues in this proceeding and not as any assertion of facts. All of the quantitative assertions are merely illustrative. If, as a procedural matter, the Commission finds that it is not appropriate to provide the attachment, HDA has no objections to withdrawing or striking the attachment.

Dated: June 25, 2009; Haiku, Hawaii

Signed: CARL FREEDMAN

Carl Freedman
dba Haiku Design and Analysis

Potential FIT Caps

- The need for potential FIT program and/or RE technology capacity cap(s) is driven by two major policy concerns associated with increased penetrations of renewable energy resources. Adding substantial additional distributed renewable energy resources could create:
 - adverse system integration and operation impacts are dependent upon the current level of existing intermittent renewable energy resources installed and operating on a particular island electric system, regardless of the procurement process used to acquire the renewable resource
 - adverse current (short term) customer rate increase impacts associated with FIT program are dependent upon the level at which FIT initial prices are set in comparison to current short-term utility avoided costs
 - which of these types of impacts becomes the binding constraint that would create need for FIT/RE technology program caps is likely to be island specific
- Potential criteria for establishing reliability based FIT program and/or RE technology cap(s)
 - Establish individual distribution circuit limits for RE resources (15% of circuit peak demand) which in turn would effectively limit the aggregate amount of distributed RE capacity to approximately 15% of total system peak demand if every circuit were at the maximum RE level. Since daily off-peak demand is typically about 50% of system peak demand; this would translate into a potential off-peak distributed RE limit of 30%. However, distribution circuit limits can only insure the reliability of individual distribution circuits and cannot insure overall system reliability is maintained since substantial intermittent renewable energy resources may be interconnected to the transmission system.
 - Establish aggregate system-wide intermittent renewable energy limits applicable to all intermittent renewable resources not just the capacity associated with distributed FIT resources connected to the distribution system. Large renewable energy projects are typically interconnected to the transmission or sub-transmission system. It is the aggregate amount of intermittent renewable energy resources interconnected at all voltage levels that determines whether there may be adverse system integration impacts.
 - Contribution of additional intermittent renewable energy during off-peak hours is likely to be of greater concern from a system integration perspective than the same contribution during on-peak hours, all other factors the same. In fact, existing curtailment of intermittent renewable

generation on the Big Island and Maui typically occurs during off-peak periods.

- Need to recognize that some RE technologies, such as solar PV, produce electricity only during on-peak periods while other technologies, such as wind, operate both on and off-peak. For example, it may be necessary to limit or preclude the addition of wind technologies, while at the same time allow additional solar technologies, on certain islands in order to maintain current levels of system reliability.
- Establishing FIT program caps, if necessary, for reliability reasons is complicated by the potential addition of major new wind projects (i.e., Big Wind impact on Oahu and Kaheawa expansion on Maui). The 400 MWs of potential capacity from Big Wind translates into approximately 1/3 of Oahu's current **on-peak system demand or 2/3 of its off-peak demand**.
- Island specific system reliability considerations and reliability based caps
 - The amount of intermittent renewable capacity on the Big Island is approximately 50 MWs or 20 - 25% of the system peak demand. Big Island may have already reached a limit on the amount of installed intermittent renewable resources that can be operated reliably during off-peak hours. A moratorium on new wind projects for HELCO during the initial FIT period would be appropriate. However, a limited amount of solar PV/CSP may be able to be accommodated. On-peak capacity limits could be set at 6 MWs for HELCO based upon the annual installed capacity limits proposed in the PVHost program for this island. It doesn't make sense to add new wind resources if doing so cause additional curtailment of existing (non-FIT) renewable resources.
 - On Maui, the amount of operable intermittent renewable capacity is 30 MWs, which excludes the pending 20 MW Kaheawa expansion or 22 MW Shell Wind addition, and represents approximately 10 – 15% of the current system peak demand. A moratorium on new wind projects for MECO during the initial FIT period would be appropriate given the proposed additions of major new wind farms. Additional solar PV/CSP (on-peak generation) may be able to be accommodated. On-peak capacity limits could be set at 6 MWs for MECO based upon the annual installed capacity limit proposed in the PVHost program for this island.
 - Oahu today has the capacity to interconnect a significant amount of renewable resources since the current installed base is small. Oahu based wind resources. Distributed renewable energy resources located on Oahu are likely to be more reliable than Big Wind connected by inter-island cables. The 15% distribution circuit limit is an appropriate cap for Oahu with no restrictions on type of renewable technology given that Big Wind would

not be operable within this time frame. This limit would also require a significant number of distributed renewable projects to be implemented within a two year time frame to reach this limit.

- Potential criteria for establishing customer rate impact based cap(s)
 - Customer rate impact is defined as the increase, or decrease, in current electric rates due solely to implementation of the FIT programs and is determined by the difference between initial FIT prices and short-term utility avoided costs (i.e., fuel or diesel oil savings)
 - Adverse rate impacts are likely to be created when FIT prices are established on the basis of renewable energy developers project costs plus a profit; otherwise, development would be occurring based upon utility avoided costs
 - A near-term rate premium for renewable energy would be appropriate if it is temporary and more than likely would be offset by the economic value of CO₂ emission reductions (carbon tax value), enhanced energy supply security and/or higher fuel oil costs.
 - The key policy issue is the amount of initial rate premium to be incurred by customers with the introduction of the FIT program. The rate premium could be established on either on the basis of a percentage rate increase or dollars per customer per month. The latter is more readily associated with a typical residential customer bill level (i.e., no more than \$ 3.00 per month electric bill increase).
 - The table below illustrates potential rate impacts for each of the HECO Companies based upon possible FIT program and RE technology caps. The FIT rate impacts for the smaller systems are not significant because reliability driven size caps limit amount of new renewable energy resources to 2 – 3% of total system sales.

<i>Illustrative at this point</i>	HELCO	MECO	HECO
System Data			
Peak Demand (MW)	200	200	1,200
Electric Sales (MWh)	1,000,000	1,000,000	7,500,000
Electric Revenues	300,000	300,000	1,200,000
FIT Initial Program Parameters			
Size Limits (MWs)	10	10	180
Annual Capacity Factor	20%	20%	20%
FIT Generation Output (MWh)	17,520	17,520	315,360
FIT Average Price (\$/MWh)	350.00	350.00	300.00
Utility Short-Term Avoided Costs	200.00	200.00	150.00
FIT Procurement Premium	150.00	150.00	150.00
FIT Cost Premium (\$000)	2,628	2,628	47,304
FIT Program Impacts			
FIT Size/System Peak (%)	5%	5%	15%
FIT Generation to Sales (%)	1.8%	1.8%	4.2%
Rate "Surcharge" Impact (c/KWh)	0.003	0.003	0.006
Percent Rate Increase (%)	0.88%	0.88%	3.94%

- For Oahu, the FIT rate impact could be higher since there is potential for significantly greater amount of renewable energy resources. However, this rate premium could be translated into a potential rate decrease when viewed in the context of the potential rate impacts associated with Big Wind and the inter-island cables. The cost of the inter-island cables represents a potential, significant avoided cost for Oahu's electric customers.

[Note that this exact type of trade-off is emerging on the mainland. Witness New England -- governors there are pushing back on national energy legislation aimed at making it easier to site and recover huge costs of 765 kv transmission to transmit Midwest wind to New England to satisfy their RPSs. NE now wants to focus on their "indigenous" renewable fuels such as biomass and other resources. The potential assessment of big transport costs seems to always have a way of causing one to look for more economic alternatives! This may apply to inter-island cable as well.]

- Stated differently, FIT prices could be set incrementally higher on Oahu (base FIT price and reliability and environmental premiums set just below inter-island cable avoid costs) to readily encourage local renewable energy resources.

CERTIFICATE OF SERVICE

The foregoing HAIKU DESIGN AND ANALYSIS REPLY BRIEF was served by electronic transmission on the date of signature below to the following parties in this docket except that as noted, the Division of Consumer Advocacy was also served two copies on the same date by first class mail:

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Dated: June 25, 2009; Haiku, Hawaii

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